SUPREME COURT, U. S.

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IN THE

Supreme Court of the United States

OCTOBER TERM, 1971

No. 71-1354

WESTINGHOUSE ELECTRIC CORP., *Petitioner,*

v.

TITANIUM METALS CORP. OF AMERICA, *Respondent.*

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

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PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

Petitioner prays that a Writ of Certiorari issue to review the decision of the United States Court of Appeals for the Ninth Circuit, rendered by a divided Court on December 15, 1971, in the above-entitled cause.

CITATIONS TO THE OPINIONS BELOW

The opinion of the Court of Appeals (by a divided Court) appears at 454 F.2d 515. It appears also in the Appendix at page 1a (A. 1a).

The findings of fact and conclusions of law of the District Court appear at 306 F.Supp. 402. They appear also in the Appendix at page 11a (References to the findings hereinafter are identified as FF ...., and to

the conclusions as Concl. .....) The judgment of the District Court appears in the Appendix at page 34a. The patent in issue resulted from a decision of the Court of Customs and Patent Appeals, which appears at 302 F.2d 749 (A. 35a).

STATEMENT ON JURISDICTION

The Opinion of the Court of Appeals for which review is sought is dated and was filed on December 15, 1971. Petition for rehearing was denied on March 14, 1972. A copy of that order appears in the Appendix at page 10a.

This Court has jurisdiction to review the opinion of the Court of Appeals pursuant to 28 U.S.C. 1254(1).

STATUTES INVOLVED

This case involves Sections 103, 141, and 144 of the Patent Act of 1952, 35 U.S.C. 103, 141, 144 (A. 43a).

QUESTION PRESENTED FOR REVIEW

Did the Court of Appeals for the Ninth Circuit properly substitute for findings of fact establishing that the invention was *un*obvious to *experts* in the art,

an artificial "obvious to try" standard to support its conclusion that the invention "*should* have been obvious,"

when the "obvious to try" standard has been repeatedly rejected by the Court of Customs and Patent Appeals,

and when the *same* invention was found to be *un*obvious by the Court of Customs and Patent Appeals after considering prior art more pertinent than that relied upon below?

CONCISE STATEMENT OF THE CASE

Introduction

The sole issue decided by the Court of Appeals concerned obviousness of the invention in suit. Detailed findings of the lower court establish that the invention *was not* obvious to the *experts* in the involved art, as Circuit Judge Choy pointed out in dissent (454 F.2d 520, A. 7a. See p. 14 *infra*.). Nevertheless, the majority of the Court concluded the invention "*should* have been obvious" to the man of *ordinary* skill. In justifying this conclusion the majority stated "it would be apparent" that elimination of a step of a prior art process "*should be tried*," even though the step in question was "*thought necessary*" by the art. (454 F.2d 518, A. 5a).

To illuminate the significance of this conclusion, a short description of the history of the litigation will be provided.

The Invention In Suit

This action involves conceded infringement * of a United States patent dealing with a metallurgical process of producing metals such as zirconium alloy (used for the structure of atomic reactors), or titanium alloy (used for aircraft structures). Structural components of these types are produced from metal ingots, which in turn are produced from "sponge" metal by a melting process. Ingots produced by a single melting process

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* The District Court denied costs to the prevailing defendant:

". . . in view of the benefit the defendant and its parent company, Allegheny Ludlum, have had from the use of the process put into practice by Allegheny Ludlum as the result of the suggestion of plaintiff's employee, Hurford. . . ." 306 F.Supp. 414 (A. 34a).

have a contaminated surface and lack homogeneity and soundness.

It was known prior to the invention of the patent in suit that improvement in the melted ingots could be achieved by remelting the ingots. However, as stated by the majority of the Court of Appeals, to those in the involved field, working or fabrication of the metal intermediate the first and second melting operations was:

> "... thought *necessary* * to obtain desired quality of zirconium alloy...." (454 F.2d 518 A. 5a)

Intermediate fabrication was carried out in two different ways. Plaintiff itself extensively performed a process in which the first melt ingot was first formed into bar, strip or rod and then chopped into small pieces. The small pieces subsequently were melted to form the second melt ingot (FF 13, 20). This method, which was used by plaintiff to produce fuel for the prototype nuclear reactor, was expressly acknowledged as prior art in the patent in suit (A. 36a).

In the prior art process relied upon by the Ninth Circuit, the so-called "828" process of the Bureau of Mines, the first melt ingot was fabricated by rolling into bar form, the bars subsequently being melted to form the second melt ingot. Though this process was used to make experimental product, ingots from the process were not commercially employed.

The intermediate fabrication process acknowledged in the patent was before the Court of Customs and Patent Appeals when it allowed the application for the patent in suit. In fact, that Court's opinion that the invention claimed in the patent in suit was patentable

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* Emphasis supplied throughout.

expressly quoted the description of that process (302 F.2d 750, A. 36a). The "828" intermediate fabrication process of the Bureau of Mines was not expressly before the CCPA but was relied on by the District Court in holding that the patent in suit was invalid.

A more pertinent prior art process was the basis of the primary issue of obviousness considered and decided by the CCPA before allowing the claims of the patent in suit. That process was disclosed in the Herres et al patent 2,541,764. (Herres was the head of research of defendant's predecessor in interest, Allegheny Ludlum, at the time the invention in issue was made.) The Herres et al patent discloses a double melting process without *any* intermediate fabrication but with addition of powdered metal during the second melting operation. The powdered metal introduced contamination (302 F.2d 752-3, A. 41a), as did the intermediate fabrication process acknowledged as prior art and described in the specification of the patent in suit. The Patent Office Examiner had stated it would have been obvious to omit introduction of the powdered metal during the remelting operation.

The invention of the patent in suit involved *direct* remelting only of the first melt ingot, as an ingot without *any* intermediate fabrication step, or the addition of anything else. The resultant product is characterized by enhanced homogeneity, soundness and cleanliness as compared with the first melt ingot (FF 5). It is also characterized by much less waste of valuable alloy, by decrease in the cost of production and by reduction in contamination (FF 32), as compared to the intermediate fabrication processes.

The CCPA held the process in suit to be unobvious, calling particular attention to the elimination of waste

and scrap attendant prior processes (302 F.2d 752, A. 40a). Indeed, that Court unanimously found a lack of any suggestion or reason in the prior art to omit from the Herres et al process the step of introduction of powdered metal during remelting, and therefore found such omission to be unobvious.

The Decisions Below

District Judge Foley concluded that the claimed invention was obvious in view of the above-described "828" process.

Circuit Judge Choy in dissent stated his view that a conclusion of unobviousness rather was compelled by the extensive findings of the District Court, which he summarized at 454 F.2d 519 (A. 7a). He then stated:

> ". . . if the double-melting process eluded the *experts* 'over six months' (probably since 1948) in a period of national need for the process during the continuing international arms race, how can it be said that the invention was obvious? The Bureau of Mines would not have produced three tons of zirconium alloy using its slow and expensive '828' process with 56 percent yield if the fast and relatively economical double-melting process which resulted in 95 percent yield had been obvious." (454 F.2d 520, A. 9a)

Nevertheless, the majority of the Court of Appeals panel sustained the conclusion of obviousness in view of the Bureau of Mines "828" process.*

In doing so, the majority took no note of the fact that the Court of Customs and Patent Appeals was made

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* The majority's opinion (454 F.2d 516, fn. 2, A. 2a) creates the impression that the "828" process (and unidentified other prior art) was found by the District Court to be *more* pertinent than the prior art before the Patent Office, and that plaintiff failed to challenge that finding. There was no such finding to challenge.

aware that double melting with intermediate fabrication was acknowledged to be old in the specification of the patent in suit, and the contaminating effect of intermediate fabrication also was acknowledged therein, nor that the CCPA held the invention in suit unobvious over a prior art process which did not include intermediate fabrication, and where the issue tendered that Court involved omission of an additional step beyond the process of the invention. Instead, the Court of Appeals majority said:

> "The district court was warranted in concluding that where intermediate fabrication, *thought necessary* to attain the desired quality of zirconium alloy, was time-consuming and contaminating, it would be apparent to those having ordinary skill in the art that elimination of the intermediate fabrication *should be tried* to see if it was really necessary. That is essentially all that happened in developing the process step described in the patent. Generally speaking, substantially less creative thought is involved in this kind of experimentation than in innovating an additional technique to be tacked onto the prior art process." 454 F.2d 518, A. 5a.

Then, despite the lower court findings identified by Judge Choy, and without any quantification of the level of ordinary skill in the pertinent art by the District Court, the two-judge majority of the Court of Appeals said:

> "Having in view the specialized character of the art here in question, the level of ordinary skill in that art was *relatively high*. This means that what might not have been obvious to one having a lower level of skill *should* have been obvious to those who were active in this particular art." 454 F.2d 518, A. 6a.

In substituting this "obvious to try" standard for the findings showing unobviousness, and assuming that the ordinary level of skill of the art was higher than the skill required to make the invention in suit, the majority not only disagreed with the three judges of the CCPA who held the invention was *un*obvious. They also disagreed with a line of decisions of that Court rejecting the "obvious to try" standard. They substituted their own determination that the invention "*should* have been obvious" for the "*would* have been obvious" test of Section 103 of the Patent Code (35 U.S.C. 103).

Petitioner's argument concerning the importance of resolution of these conflicts by this Court will be developed hereinafter.

ARGUMENT

This Court Should Resolve the Conflict Between the "Obvious To Try" Standard, Utilized by the Court Below To Support Its Conclusion That the Patented Invention "Should Have Been Obvious", and a Line of Contrary Decisions by the Court of Customs and Patent Appeals Which Are Binding on the Patent Office

The majority opinion of the Court of Appeals panel reasoned from an artificial "obvious to try" standard to an erroneous conclusion that the invention "*should** have been obvious" to the man of ordinary skill in the art. The opinion directly conflicts with a long-standing line of decisions of the Court of Customs and Patent Appeals overruling Patent Office decisions which rejected patent applications on the "obvious to try" standard.

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* Under 35 U.S.C. 103 the question rather is whether the invention ". . . *would* have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

In *Application of Tomlinson*, 363 F.2d 928, 931 (CCPA 1966), the Court said:

> "The examiner, . . . [said] 'it would be obvious for a skilled chemist to try [the invention] . . . .' Our reply to this view is simply that it begs the question, which is obviousness under section 103 of compositions and methods, *not of the direction to be taken in making efforts or attempts.* Slight reflection suggests, we think, that there is usually an element of *'obviousness to try'* in any research endeavor, that it is not undertaken with complete blindness but rather with some semblance of a chance of success, and that patentability determinations based on that as the test would not only be *contrary to statute* but *result in a marked deterioration of the entire patent system as an incentive to invest in those efforts and attempts which go by the name of 'research'.*"

To the same effect are *Application of Huellmantel*, 324 F.2d 998, 1001 (fn. 3) (CCPA 1963); *Application of Lindell*, 385 F.2d 453, 455 (CCPA 1967); *Application of Chi K. Dien*, 371 F.2d 886, 887-8 (CCPA 1967); *Application of Whiton*, 420 F.2d 1082, 1085 (CCPA 1970).

In *Dien*,* as here, the inadequacies of the prior art

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* In analyzing *Dien*, commentators Dunner, Gambrell and Kayton, in "Patent Law Perspectives", Matthew-Bender 1967-8, Annual Review, page A-12, found correlation with the Supreme Court decision in *United States* v. *Adams*, 383 U.S. 39 (1966), saying:

> "Indeed, looking back at *United States* v. *Adams*, it is difficult to imagine how that patent could have been held valid if an 'obvious to try' standard of patentability had been adopted. In that case, most people would agree that it was 'obvious to try' the combination of the Adams battery, but no one had ever tried it nor was there any teaching why anyone should have tried it. *It would seem That In re Dien in combination with United States* v. *Adams should lay to rest the 'obvious to try' basis for rejecting claims.*"

were urged to indicate obviousness of trial of a change in the prior art process. The CCPA found unobviousness, saying:

> "But the *mere existence of an unsatisfactory process* and the attendant incentive to seek improvement do not negative patentability. We think one cannot fairly infer obviousness from the inadequacies of the prior art." 371 F.2d 888.

Accused patent infringers can be expected to cite the adoption by the Ninth Circuit of the "obvious to try" standard in ever-increasing numbers. Patent owners can be expected to cite the above-identified CCPA decisions. The direct conflict will lead to increasing confusion in resolution of obviousness issues, which dominate nearly all patent litigation.

Moreover, since it is the CCPA which considers appeals from the Patent Office (35 U.S.C. 141, 144), and the "obvious to try" standard therefore cannot be used by Examiners*, patents necessarily will continue to be granted by the Patent Office which cannot survive challenge by that standard, just as the Gordon and Hurford patent in suit did not.

The conflict should be resolved by this Court.

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* The Patent Office Board of Appeals stated in *Ex Parte Mohr*, 77 USPQ 510, 512 (1948):

> "The approved practice is for this Office to follow the U.S. Court of Customs and Patent Appeals in its interpretation of the Patent Laws, in the event of apparent conflict in the decisions of that Court and any of the Circuit Courts of Appeal."

Accord: *Ferm* v. *Nachtman*, 99 USPQ 165, 166 (Comm. Pats. 1948); *Smith and Stadum* v. *Klemperer*, 103 USPQ 275, 279 (P.O. Bd. Int. Exrs. 1949).

The Conflict With the CCPA Extends to the Question of Obviousness of the Very Invention in Suit

As pointed out hereinabove, the patent in suit was issued on the basis of a determination of unobviousness of the invention by the CCPA. In so doing that Court quoted from the acknowledgement in the Gordon and Hurford specification of a prior art process closely similar to the prior art process on which the majority decision below based a conclusion of obviousness. Further, the CCPA considered a more pertinent prior art process than either of these intermediate fabrication processes, one involving remelting and not including *any* intermediate fabrication. That was the Herres et al. patent treated at length in the CCPA decision 302 F.2d 751-3, A. 38a-42a). That patent disclosed remelting without intermediate fabrication but with addition of metal powder during the remelting operation.

Indeed, the CCPA expressly reversed a Patent Office rejection of the invention in suit on the basis that it assertedly would be *obvious to omit* the addition of metal powder during remelting*, thereby to obtain the direct remelting process of the patent in suit (302 F.2d 753, A. 41a). The basis for the reversal was the absence of suggestion in the prior art of this omission. Similarly there is no suggestion in the prior art of *omission* of an intermediate fabrication step of the "828" process "thought necessary" in the art.

The majority of the court below had more evidence of unobviousness before it than the CCPA but rejected the unanimous conclusion of the three judges of that Court.

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* A better illustration of something "obvious to try" would be hard to imagine.

The CCPA decided the Gordon and Huford process was unobvious because the prior art did not suggest direct remelting and the complete elimination of the waste and scrap attendant the prior processes (302 F.2d 752, A. 40a). The same situation exists in comparing the "828" process with the invention in suit. As Judge Choy said in dissent below, the record (O 85, 87, 89) shows that the 56% yield of the "828" process was immediately increased to 95% yield when direct remelting was employed (454 F.2d 520, A. 9a).

The conflict between the unanimous decision of three judges of the CCPA and the split decision of the Court of Appeals should be resolved.

The Hindsight Determination of What "Should Have Been Obvious" to One Assumed To Have a "Relatively High" Level of Skill Conflicts With Decisions of This and Lower Courts Approving Reference to the Actual History of the Art as an Indication of the Level of Skill

The District Court did not quantify the level of ordinary skill of the art. Nevertheless, the majority below assumed a "relatively high" level of ordinary skill "in view of the specialized character of the art here in question", and stated that something which might not have been obvious to one of lesser skill nevertheless "*should* have been obvious to those who were active in this particular art." (454 F.2d 518, A. 6a). In so doing, the majority ignored controlling authority.

Mr. Justice Clark's opinion in *Graham* v. *John Deere Co.*, 383 U.S. 1, 36 (1966), made approving reference to Judge Learned Hand's statement in *Reiner* v. *I. Leon Co.*,* 285 F.2d 501, 503-4 (2d Cir. 1960):

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* Recently cited with approval in *Bowser, Inc.* v. *United States*, 388 F.2d 346, 351 (Ct. Cl. 1967); *White* v. *Fafnir Bearing Co.*, 389 F.2d 750, 754 (2d Cir. 1968); *Kardulas* v. *Florida Machine Products Company*, 438 F.2d 1118, 1124-5 (5th Cir. 1971); and *Woodstream Corp.* v. *Herter's Inc.*, 446 F.2d 1143, 1157 (8th Cir. 1971).

> "Nor may we approach the interpretation of § 103 of the Title 35 with a predetermined bias. The test laid down is indeed misty enough. It directs us to surmise what was the range of ingenuity of a person 'having ordinary skill' in an 'art' with which we are totally unfamiliar; and we do not see how such a standard can be applied at all except *by recourse to the earlier work in the art, and to the general history of the means available at the time.* To judge on our own that this or that new assemblage of old factors was, or was not, 'obvious' is to substitute our ignorance for the acquaintance with the subject of those who were familiar with it."

Even the *experts* in this art *"thought"* intermediate fabrication was *"necessary."* The majority opinion so recognizes. 454 F.2d 518 (A. 2a, fn. 1). It is submitted that only by ignoring this statement and the supporting findings of the District Court, and substituting its own determination of what *"should* have been obvious," could the majority find obviousness here. This is contrary both to the rationale of *Reiner* and other relevant authority. Where the experts cannot see the solution to the problem, unobviousness certainly is indicated. *Jones Knitting Corp.* v. *Morgan,* 361 F.2d 451, 458 (3rd Cir. 1966).

Judge Learned Hand held omission of something "thought necessary" to be unobvious in *Acrovox Corp.* v. *Concourse Electric Corp.,* 65 F.2d 386, 388 (2d Cir. 1933) saying:

> "The situation is an old one in patent law; the omission of what had been *'thought necessary'* before, and the substitution of simple contrivances which better answered the difficulties. When an art has for long gone on the assumption that it is necessary to retain an element, ineffective and un-

> certain in operation, its omission ought not to be rated within the compass of the routineer. *History is a safer guide than speculation after the event.*"

The findings of the lower court establish that plaintiff's co-inventors Hurford and Gordon were *expert* metallurgists but that even they thought at the time they conceived their invention that intermediate fabrication was essential to obtain the necessary homogeneity and soundness (FF 26, 35). They therefore adopted and thereafter extensively practiced the intermediate fabrication step of forging and rolling the first melt ingot to sheet stock, chopping the sheet into pieces and admixing before remelting (FF 13, 34, 38). It was not until many months later when the experts at Allegheny Ludlum were unable to furnish satisfactory product, that Gordon and Hurford authorized the first trial of direct remelting (FF 36, 39-42, 45-50, 60-65).

The Bureau of Mines' experts regularly performed intermediate fabrication for months in their "828" process (FF 19-21), despite the wastage, increased cost and contamination (FF 33), and they unsuccessfully attempted to avoid remelting at all by improving the initial melting step (FF 28).

The experts at Allegheny Ludlum did not make the direct remelting invention until it was communicated to them by co-inventor Hurford, despite their known expertise in consumable electrode arc melting and their concern with disposition of unsatisfactory, or "scrap", ingots (FF 37, 39, 46, 58, 69, 76 Conclusion B and ORDER).

If the *experts* of these three organizations, faced with the need of a better process for months, did not in fact try omission of the intermediate fabrication step, because it was "thought necessary," could the level of *ordinary* skill be properly concluded to be such that it "should have been obvious"?

The *history* of the art, as developed by the lower court's findings, shows continuation of intermediate fabrication despite its known deficiencies, thereby evidencing a level of skill such that the invention in suit was *un*obvious.

This Court should critically review the approach to the determination of obviousness taken by the majority below in this case (and in all too many other cases), namely the substitution of the Court's determination of what "*should* have been obvious" to the man of ordinary skill, for the showing of unobviousness to the *expert* established by the findings adopted by the District Court. Such a hindsight subjective approach may account for the fact that the 9th Circuit has held invalid 55 of the 65 patents which have come before it since this Court decided *Graham* v. *John Deere*, 383 U.S. 1 (1966).

CONCLUSION

Not only did use by the majority below of the "obvious to try" standard result in the determination of obviousness of the patent in suit, in the face of a determination of unobviousness by the CCPA of the *same* patented method over art *more* pertinent than that relied on by the Court below, but it can be expected to result in an increasing number of conflicts between

decisions of the Patent Office and the CCPA granting patents, and decisions of the other federal courts holding those *same patents* invalid for obviousness.

The clear conflict should be resolved by this Court.

Respectfully submitted,

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APPENDIX

APPENDIX

WESTINGHOUSE ELECTRIC CORPORATION,
Appellant,

v.

TITANIUM METALS CORP. OF AMERICA,
Appellee.

No. 25145

United States Court of Appeals, Ninth Circuit

Dec. 15, 1971

Affirmed.

Choy, Circuit Judge, dissented and filed opinion.

Before CHAMBERS, HAMLEY and CHOY, Circuit Judges.

HAMLEY, Circuit Judge:

Westinghouse Electric Corporation brought this patent infringement action against Titanium Metals Corp. of America, for infringement of U.S. Patent 3,072,982. The district court held that Titanium had infringed the patent, but rendered judgment for Titanium on the ground that the patent is invalid for obviousness, under 35 U.S.C. § 103. Westinghouse appeals. We affirm.

The patent pertains to a step in the process for transforming a first arc-cast ingot of reactive metal such as zirconium, having a contaminated surface and lacking homogeneity and soundness, into a clean, sound and highly homogeneous ingot. The process step covered by the alleged patent comprised the employment of the solid arc-cast first ingot, without intermediate fabrication, as an electrode and consumably arc remelting the first ingot alone in a cooled mold, the mold forming the outer electrode.

In support of its determination that the alleged invention was obvious on April 4, 1952, when inventors Hurford and Gordon first disclosed the process to their subordinates, the district court made extensive findings of fact (eighty-two paragraphs), followed by conclusions of law, all of which are set out in 306 F.Supp. 402 (D.C.Nev.1969). We will assume that the reader of this opinion is familiar with those findings and conclusions.

The district court, in conclusion of law G, at 306 F.Supp. 414, gave two independent reasons for its decision that the process was obvious and therefore non-patentable. First, the court said, the prior art, and especially the Bureau of Mines' "828" process,[1] made the subsequent development of the patent process obvious to one skilled in the art.[2] Second, the court reasoned, the subsequent, but almost simultaneous, independent development of the Bureau of

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[1] Under the Bureau's "828" process, the eight-inch diameter first metal ingot was forged and rolled to two-inch by two-inch bars and those consumably remelted in an eight-inch crucible. Testimony at the trial by Bureau employees was to the effect that forging and rolling was necessary only in order to resize the first-melt ingots to two-inch square electrodes to fit the feed mechanism of the Bureau's furnace, and that no improvement in homogeneity and soundness was attributed at that time to the intermediate forging and rolling operation.

But the contemporaneous Bureau reports did not so state. Rather, they attributed improvement in homogeneity and soundness to the operations actually performed, namely, forging and rolling followed by remelting. The trial court did not resolve this conflict and, for present purposes we will therefore assume that, prior to April 4, 1952, it was thought that an intermediate step of forging and rolling was necessary to attain satisfactory results with the Bureau's "828" process.

[2] We note that the district court found as facts that the Patent Office had not cited or considered either the "828" process or certain other elements of the most pertinent prior art. The court concluded from these findings that the presumption of validity normally accorded to an issued patent under 35 U.S.C. § 282 had been overcome. We do not understand appellant Westinghouse to challenge

Mines' "610" process (identical to the patent process in all material respects) also required the conclusion that the patent process was obvious.

Appellant Westinghouse attacks both reasons given by the district court for its conclusion that the patent was obvious. First, Westinghouse advances three related arguments which, taken together, present the question of whether the district court was correct in reasoning that conceded prior art, including the "828" process, made the patent process obvious under the governing statute and court decisions. None of the facts found by the district court to support this reasoning are challenged by Westinghouse.[3]

The criteria to be applied in determining whether an alleged invention is obvious, and therefore not patentable under 35 U.S.C. § 103, are set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966). Under those criteria, the district court is required to determine the obviousness or nonobviousness of the asserted invention against the background of its findings as to: (1) the scope and content of the prior art, (2) the differences between the prior art and the claims at issue, and (3) the level of ordinary skill in the pertinent art. Such secondary considerations as commercial success, long felt

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those findings or that conclusion; but, in any event, we think the district court was correct. T. P. Laboratories, Inc. v. Huge, 371 F.2d 231, 234 (7th Cir. 1966). *See* Pressteel Company v. Halo Lighting Products, Inc., 314 F.2d 695, 697 (9th Cir. 1963); Jaybee Mfg. Corporation v. Ajax Hardware Mfg. Corporation, 287 F.2d 228, 229 (9th Cir. 1961). Consequently, the way was open for the district court to independently determine if the patent was void for obviousness free from any such presumption.

[3] The only finding of fact which Westinghouse challenges here is No. 29, at 306 F.Supp. 406; and that finding has relevance only to the district court's second reason for finding the process obvious, *i.e.*, the independent development of the "610" process.

but unsolved needs, and the failures of others, may be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented, and have relevance to that extent.

The parties are not in dispute as to these criteria—they simply disagree as to whether the district court properly applied them in this case under the undisputed findings of fact. Westinghouse calls attention to the fact that, applying the *John Deere* criteria, the Supreme Court, in United States v. Adams, 383 U.S. 39, 86 S.Ct. 708, 15 L.Ed.2d 572 (1966) held that the asserted invention there in issue was nonobvious. Westinghouse contends that the case now before us is more like *Adams* than it is like the *John Deere* case, in which the patent was held invalid for obviousness. We do not believe it would be particularly helpful for us to undertake a determination of whether the case before us is more like *Adams* than *John Deere*. The more direct inquiry is whether, in view of the undisputed *John Deere* criteria, the findings of the district court support its conclusion that the process in question was obvious on April 4, 1952, to a person having ordinary skill in the art.

Examination of the findings of fact reveals that, in reaching its conclusion, the district court gave detailed consideration to the first two of the *John Deere* criteria, namely (1) the scope and content of the prior art, and (2) the differences between the prior art and the patent claim at issue. According to these findings, in the prior art there had been forging, rolling or fabrication of the first arc-cast ingot into different shapes and sizes before the consumable arc remelting process was undertaken. This was true, for example, in the Bureau's "828" process.

The process step described in the patent would eliminate this intermediate forging, rolling or fabrication between the melting which produced the first arc-cast ingot, and the consumable arc remelting described above. The elimination of this intermediate work is the novel feature of the asserted invention.

The third prime criterion to be considered, namely, the level of ordinary skill in the pertinent art, is also dealt with extensively in the findings of fact. This was done by describing, in detail, the skill exercised by those concerned with the problem, in finding a way to produce zirconium alloy in substantial quantities which would have the desired qualities mentioned above. Likewise, the findings deal with the secondary indicia of obviousness referred to in *John Deere*, commercial success of the process step described in the patent, the period during which the need was unsolved and the difficulties experienced by others in attempting to solve the need.

In our opinion, the prior art and, in particular, the "828" process, as described in the findings, together with the unchallenged findings bearing upon the other pertinent criteria, warranted the district court in concluding that the process step described in the patent was obvious.

The novel feature of the process step is exceedingly limited. It does not consist of the development of an additional technique, but the elimination from the prior art process of one of the features of that process, *i.e.*, intermediate forging, rolling or fabrication. Even the elimination of this technique has some recognition in the prior art, as shown by finding of fact No. 14, describing nonconsumable arc remelting of arc-melted refractory metal fifty gram buttons without intermediate forging or rolling.

The district court was warranted in concluding that where intermediate fabrication, thought necessary to attain the desired quality of zirconium alloy, was time-consuming and contaminating, it would be apparent to those having ordinary skill in the art that elimination of the intermediate fabrication should be tried to see if it was really necessary. That is essentially all that happened in developing the process step described in the patent. Generally speaking, substantially less creative thought is involved in this kind of experimentation than in innovating an additional technique to be tacked onto the prior art process.

This is not to say that there cannot be invention absent a stroke of inventive genius. It may, in fact, be the fruit of an accident or serendipity. But whether it was obvious nevertheless depends in part upon the degree of creativity one having ordinary skill in the art would need to exercise in arriving at the same new idea without the help of an accident or unintended emergence of that idea. Having in view the specialized character of the art here in question, the level of ordinary skill in that art was relatively high. This means that what might not have been obvious to one having a lower level of skill should have been obvious to those who were active in this particular art.

None of the findings bearing upon the secondary criteria of obviousness, in our view, undermine the district court's determination that this claimed process step was obvious. Nor do we believe this determination is suspect because of the fact that until Hurford and Gordon thought of dropping the intermediate fabrication step, the idea did not occur to any of the other experts in the field. If this consideration were held to establish nonobviousness, the test of obviousness would be useless, since the asserted inventor must always be the first person to think of the idea and disclose it to others.

In summary, we are convinced that the district court correctly applied the criteria of the *John Deere* case in reaching its conclusion that the conceded prior art, including the "828" process, made the patent process obvious to one with ordinary skill in the art. Because this conclusion is sufficient to invalidate the patent under 35 U.S.C. § 103, we find it unnecessary to consider the correctness of the district court's second reason for finding the patent obvious, and we therefore decline to rule upon appellant's fourth and fifth arguments, which attack that second reason.

Affirmed.

CHOY, Circuit Judge (dissenting):

I respectfully dissent. I would hold that the District Court erred in concluding that the patent was invalid as "obvious at the time the invention was made to a person having ordinary skill in the art" under 35 U.S.C. § 103.

Accepting as sustained by the evidence in the record all of the findings of fact which are precursive to consideration of this crucial issue of obviousness, it is my opinion that a conclusion of nonobviousness of the invention is compelled by the following findings:[1]

1. The published prior art contained no suggestion of direct consumable arc remelting of ingots of metal. (16)

2. The fabrication techniques which involved chopping up, or forging and rolling the initial arc-cast ingot before remelting (as in the Bureau of Mines' "828" process) were time-consuming and expensive and inevitably resulted in "contamination" of the metal. (13, 20, 27)

3. For some months prior to completion of the invention, the Bureau of Mines, by its "828" process, had been remelting zirconium alloy metal, and up to at least July 26, 1952, had remelted three tons of such metal by that process. (19)

4. The wastage, increased cost of production and increased contamination incident to the "828" process created a need for the invention over six months before the invention was completed. (33)[2]

5. On July 26-28, 1952, subsequent to, but not long after, the invention was developed, the Bureau of Mines inde-

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[1] The figures in parentheses are Findings of Fact numbers as found in the District Court opinion, 306 F.Supp. 402 (Nev. 1969).

[2] The need appears to have existed as early as 1948 when the U.S. Navy began development of atomic reactors to power naval vessels. During 1950-51 Westinghouse constructed a prototype or Mark I nuclear reactor made from more than 20 tons of "crystal bar" zirconium which was produced from zirconium sponge by a tedious and expensive purification process. Findings of Fact 6-10.

pendently and successfully employed its "610" direct double-melting technique without intermediate fabrication. (29, 44, 50, 51)

6. Direct remelting without intermediate fabrication resulted in much less waste of valuable zirconium alloy, decrease in cost of production, and reduction in contamination while still obtaining good homogeneity and soundness. (32)

7. The invention was immediately adopted by others and used to prepare zirconium ingots and has gone into universal use to produce sound homogeneous ingots of reactive metals. (81, 82)

In Graham v. John Deere Co., 383 U.S. 1, 17-18, 86 S.Ct. 684, 694, 15 L.Ed.2d 545 (1966) the Supreme Court established the standards to be applied in determining obviousness under 35 U.S.C. § 103:

> "Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy."

The District Court did determine the scope and content of the prior art; it did ascertain the differences between the prior art and the invention at issue; but it did not resolve the level of ordinary skill in the pertinent art.[2] The

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[2] It appears that all of the evidence presented dealt with or emanated from only experts in the field of metallurgy; *e.g.*, Kroll of the Bureau of Mines, who developed a process for the production of sponge zirconium; Parke and Ham, who published a paper on the melting of molybdenum in the vacuum arc; Hayes, chief of the physical metallurgy branch, Bureau of Mines; Stephens (former

Findings of Fact furnish a rather clear conception of the efforts and developments on the part of metallurgy experts dealing with reactive metals. But we are given nothing about the level of ordinary skill in the art, about the metallurgist or technician of ordinary skill and how obvious or unobvious the invention was to him when it was made. Obviously, the expert cannot be equated with the "person having ordinary skill in the art" contemplated by § 103. An expert is by his very nature unordinary.[4]

At any rate, if the double-melting process eluded the experts "over six months" (probably since 1948) in a period of national need for the process during the continuing international arms race, how can it be said that the invention was obvious? The Bureau of Mines would not have produced three tons of zirconium alloy using its slow and expensive "828" process with 56 percent yield if the fast and relatively economical double-melting process which resulted in 95 percent yield had been obvious.

The speedy commercial success and universal use of the process attest to the great need of the invention. The independent and almost contemporaneous, but subsequent development of the "610" process by the Bureau of Mines does not denote obviousness in my opinion. If it did, then every time two or more inventors independently devise an invention, however novel, ingenious and unobvious, within a short time of each other, the inventions would be "obvious" under the statute. The entire purpose of the law of patent interference is to determine who first invented the item at issue. Appellant's inventors won the race to the patent office, and should be protected.

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chief of the rare metals branch, Bureau of Mines), metallurgist with Carborundum Metals Co.; Gordon and Hurford, the actual inventors of the process in issue here; Herres, head of titanium research at Allegheny Ludlum; and Kuhn, expert of Titanium Alloy Manufacturing Division, National Lead Company.

[4] See Abington Textile Machinery Works v. Carding Specialists (Canada) Ltd., 249 F.Supp. 823 (D.C., D.C.1965).

In the United States Court of Appeals
For The Ninth Circuit

Filed March 14, 1972

Wm. B. Luck, Clerk.

WESTINGHOUSE ELECTRIC CORPORATION,
Appellant,

v.

TITANIUM METALS CORP. OF AMERICA,
Appellee.

No. 25,145

Order

Before: CHAMBERS, HAMLEY and CHOY, Circuit Judges.

The panel as constituted in the above case has voted to deny the petition for rehearing and to reject the suggestion for a rehearing in banc.

The full court has been advised of the suggestion for an in banc hearing, and no judge of the court has requested a vote on the suggestion for rehearing in banc. Fed.R.App.P. 35(b).

The petition for rehearing is denied and the suggestion for a rehearing in banc is rejected.

Frederick G. Hamley, United States Circuit Judge.

WESTINGHOUSE ELECTRIC CORPORATION,
Plaintiff,

v.

TITANIUM METALS CORPORATION OF AMERICA,
Defendant.

Civ. A. No. 792

United States District Court
D. Nevada
Oct. 1, 1969

FINDINGS OF FACT

ROGER D. FOLEY, Chief Judge.

1. This is an action for patent infringement brought by the plaintiff, Westinghouse Electric Corporation, against defendant, Titanium Metals Corporation of America, for infringement of United States Patent 3,072,982 which issued in the names of the applicants, Robert B. Gordon and Walter J. Hurford, on January 15, 1963.

2. Plaintiff is a Pennsylvania Corporation having its principal offices in Pittsburgh, Pennsylvania, while defendant is a Delaware Corporation having a regular and established place of business at Henderson, Nevada, in this judicial district, where it has performed the process accused of infringement within the six-year period preceding the filing of the complaint herein on June 17, 1965.

3. United States Patent 3,072,982 embraces an alleged invention resulting from performance under a Government contract with the Atomic Energy Commission. The United States Government enjoys a royalty-free license under the patent in suit. Defendant incurs no liability under this patent for any operations conducted on behalf of the United States Government.

4. Shortly after issuance of the patent in suit, plaintiff offered defendant a license under the patent, but such offer was refused.

5. U.S. Patent 3,072,982 was issued by the U.S. Patent Office following a decision favorable to patentability of the claims by the United States Court of Customs and Patent Appeals, Application of Gordon, 1962, 302 F.2d 749, 49 CCPA 1086. The alleged invention of the '982 patent involves the concept of preparing a first arc-cast ingot of a reactive metal such as zirconium, titanium, tantalum, uranium or the like and, without intermediate fabrication of such ingot, remelting it as a consumable electrode to produce a second ingot. Such process broadly is recited in claim 6:

> "6. In the process of preparing a clean, sound and highly homogeneous ingot of a metal from a first arc-cast ingot having a thick contaminated surface and lacking homogeneity and soundness, the step comprising employing the solid arc-cast first ingot as an electrode and arc melting the first ingot alone in a cooled mold, the mold forming the other electrode, the arc-melting being carried out under vacuum, whereby such arc-melting deposits only the metal from the first ingot into said mold and produces therein a clean surfaced ingot which is sound and highly homogeneous."

The ingot resulting is generally characterized by enhanced homogeneity, soundness and cleanness as compared to the first-melt ingot as produced in processes practiced by the prior art.

HISTORICAL BACKGROUND

6. Shortly after World War II, the United States Navy began the development of atomic reactors to power naval vessels. In 1948, the AEC entered into a contract with plaintiff to design and furnish a prototype of the desired nuclear reactor. Plaintiff operated a Government-owned facility called Westinghouse Atomic Power Division (WAPD). Pursuant to this and a subsequent Government contract, propulsion plants for the Navy's atomic submarines were developed and installed by Westinghouse.

7. Early in the consideration of the shipboard atomic reactor, zirconium was chosen as the structural metal to be employed in view of its high melting point, corrosion resistance in a hot water environment, and low nuclear cross section. These characteristics are prerequisite to an atomic reactor of the type proposed.

8. As of 1949, zirconium was, for the most part, a laboratory curiosity which had been produced in small quantity and used principally as a gettering agent in incandescent lamps or vacuum tubes. A process for the production of sponge zirconium was developed by Kroll, an employee of the Bureau of Mines and, until the mid 50's the Bureau remained the single quantity producer of sponge zirconium metal.

9. Zirconium sponge, due to its method of production, was and is contaminated with volatile materials, principally magnesium and magnesium chloride. Since, at the time, only pure zirconium metal was believed to possess requisite corrosion resistance in extended hot water environment, the prototype or Mark I reactor designed, constructed and installed by plaintiff at an Idaho test site during 1950-51 was made from "crystal bar" zirconium. This material is a highly pure zirconium produced from zirconium sponge by a tedious and expensive purification process

10. WAPD manufactured crystal bar zirconium from sponge for construction of the successful Mark I prototype reactor. More than twenty tons of crystal bar were melted in tungsten-tipped, non-consumable electrode furnaces to produce ingots about 4 inches in diameter and 12 inches long. These ingots then were fabricated into the structural shapes necessary to construct the Mark I reactor.

11. Fuel elements of the atomic reactor comprised an alloy of zirconium and a small proportion of uranium. In order to be acceptable, the fuel elements required a uniform distribution of the uranium in the zirconium, i.e., alloy homogeneity.

12. During work on the Mark I reactor, it was determined that requisite corrosion resistance could be obtained without attenuation of the other desirable properties of zirconium, if it were alloyed with a small percentage of other elements including tin. Again, satisfactory performance in the structural elements of the reactor required alloy homogeneity. In order to satisfy the requirements for both structural and fuel elements, it was essential to develop methods for producing homogeneous, sound and clean ingots of zirconium alloy for subsequent fabrication into the desired shapes.

13. At WAPD, the homogeneity problem initially was approached by adopting a known process which involved forging and rolling the initial ingot to sheet stock. The sheet then was chopped up in pieces, admixed and remelted in a nonconsumable tungsten electrode furnace to produce a second ingot. Acceptable homogeneity was achieved but the fabrication techniques employed were both time-consuming and expensive and, in addition, were responsible for undesirable contamination of the highly reactive metal with embrittling oxygen and nitrogen.

14. The prior art taught the nonconsumable arc remelting of arc melted refractory metal 50 gram buttons, without intermediate forging or rolling, to improve the homogeneity of the metal.

15. However, the very limited depth of melting which can be achieved by this method limits its use to very small sizes, up to 250 grams (about ½ pound), and the method is impractical for larger sizes. Moreover, without chopping into pieces before remelting, the desired degree of homogeneity was not obtainable by button remelting.

16. The published art prior to the alleged invention of the patent in suit contains no suggestion of direct consumable arc remelting of ingots of metal.

17. The prior art taught the consumable arc melting technique employed in the remelting step of the process patented by plaintiff.

18. The Patent Office was not apprised of, and did not cite, the prior art. (Hayes, et al., Kroll and Parke and Ham publications.)

THE BUREAU OF MINES HISTORY

19. The United States Bureau of Mines had established, prior to the alleged invention, that the homogeneity and soundness of zirconium alloy ingots can be improved by fabricating the ingots into smaller shapes and remelting those shapes. In one experiment, an ingot was fabricated into bar shape and consumably remelted, while in another experiment an ingot was fabricated into chopped sheet which was nonconsumably arc remelted. Both experiments resulted in improved homogeneity and soundness, though the chopped sheet technique gave better homogeneity and soundness than the fabricated bar technique.

The Bureau of Mines thereafter identified ingots rejected as out of specification in the following manners:

B_1—suitable for remelt as formed electrode;

B_2—suitable for remelt as chopped sheet;

C —reject.

In the formed electrode technique, the 8 inch diameter first melt ingot was forged and rolled to 2 inch x 2 inch bars and those bars consumably remelted in an 8 inch crucible.

The Bureau of Mines had, for some months prior to completion of the alleged invention here in issue, been regularly remelting zirconium alloy metal by such a process, which is referred to as the "828" process, at its Albany, Oregon, station. That use was to such an extent that Bureau of Mines employees later reported having melted three tons of metal by the "828" process.

20. In the Bureau of Mines' "828" process, the metal to be remelted was not subdivided into pieces for mechanical intermixing and blending prior to remelting, as it was in the

chopped sheet process referred to in finding 19 and previously performed extensively at WAPD under supervision of the alleged co-inventors of the patent in suit. The "828" process demonstrated that enough blending of the ingredients of the metal can be achieved by the forging and rolling and consumable remelting technique to result in the necessary improvement in homogeneity and soundness.

21. The "828" process did involve forging and rolling between the first and second meltings of the ingot. The testimony at the trial by persons who were employees of the Bureau of Mines at the time in question was to the effect that forging and rolling was necessary only in order to resize the first melt ingots to two-inch square electrodes to fit the feed mechanism of the Bureau's furnace, and that no improvement in homogeneity and soundness was attributed at the time to the intermediate forging and rolling operations.

22. The contemporaneous Bureau of Mines' reports did not state that the only reason for forging and rolling prior to remelting in the "828" process was to accommodate to the size of the feed mechanism of the furnace used for remelting. Rather, the reports attributed improvement in homogeneity and soundness to the operations actually performed, namely, forging and rolling, followed by remelting.

23. It was not until July 28, 1952, that the Bureau of Mines initially remelted an ingot without first forging to bar form. It was not until about August 15, 1952, that the Bureau of Mines reported that they had demonstrated that the necessary improvement in homogeneity and soundness could be achieved by mere blending of the ingredients within the molten pool during the remelting process.

24. The statements in the testimony to the effect that it was known at the Bureau of Mines at the time the "828" process was practiced that the forging and rolling operations, including accompanying heating, did not contribute to improvement in homogeneity and soundness, are incon-

sistent with contemporaneous documents originating with the Bureau of Mines.

25. No Bureau of Mines' reports, letters nor any other evidence introduced at the trial indicate that the only reason for the Bureau of Mines to forge and roll first-melt ingots was to accommodate to the size of the feeding rolls in the furnace used to make the second-melt ingot.

26. Hurford, an expert metallurgist, testified at the trial that in 1952, before completion of the alleged invention in suit, he thought the forging and rolling in the "828" process was necessary to improve homogeneity and soundness.

27. Prior to the alleged invention here in suit, it was appreciated by those skilled in the art of melting zirconium and titanium metals and alloys, that forging and rolling prior to remelting costs time and money and inevitably resulted in contamination, i.e., the raising of the oxygen and nitrogen content of the metal which cannot thereafter be reduced to their former values by remelting.

28. In October 1951, at the outset of its zirconium alloy melting program, the Bureau of Mines confirmed, as stated in finding 19 above, that the homogeneity and soundness of this material could be improved by fabricating and consumable arc remelting of the first-melt ingots. But, since remelting costs money and takes time, the Bureau of Mines devoted considerable effort to measures designed to make satisfactory ingots with only one melting, such as improved methods of adding tin and magnetic coil stirring techniques. Nevertheless, fabrication and remelting continued to be necessary for a large number of ingots, either at the Bureau of Mines or their destination, until after July 28, 1952.

29. During the June 15-July 15, 1952, reporting period, the Bureau of Mines had completed construction and had in operation a new consumable electrode arc furnace called Model II. At the end of that period, it was being used to produce one homogeneous and sound ingot per day from

electrodes forged and rolled from ingot. During the next month, the crucible diameter reportedly was increased without undue difficulties to permit melting a 10 inch ingot, and the first one was produced on July 18, 1952. On July 26-28, 1952, using this new furnace, the Bureau of Mines successfully employed the direct double-melting technique without the intermediate fabrication, which became known as the "610" process. The evidence does not support plaintiff's contention that the Bureau of Mines may have developed the "610" process after having been informed of the success of Allegheny Ludlum in directly remelting ingots as ingots without intermediate fabrication, between July 12 and July 23, 1952. (See finding 50, infra.)

30. Knowledge of the Bureau of Mines' "828" process was communicated to a number of persons and organizations, including Westinghouse, by monthly reports.

31. The Patent Office was not apprised of the Bureau of Mines' "828" process.

32. Direct remelting without intermediate fabrication resulted in much less waste of valuable zirconium alloy, decrease in the cost of production, and reduction in contamination, while still obtaining good homogeneity and soundness.

33. The wastage, increased cost of production, and increase in production contamination incident to the forging and rolling operations in the "828" process created a need for the alleged invention in suit over six months before it was completed.

THE ALLEGHENY LUDLUM HISTORY

34. In late October, 1951, Hurford, the individual in charge of melting development at WAPD, visited the Bureau of Mines to discuss the problems then existing in the production of satisfactory zirconium ingots. At this time, the Bureau of Mines had performed the tests of finding 19

above, but had not yet developed its "828" technique. Upon his return, Hurford discussed the problems inherent in the various known melting processes with his superior, Gordon.

35. During this discussion, Gordon and Hurford discussed the process of the patent in suit, i.e., the direct remelting of the first-melt ingot as an ingot without intermediate fabrication. Gordon and Hurford agreed that such a process might avoid the time-consuming and contaminating intermediate fabrication step. At that time, however, they, and particularly Hurford, felt that the intermediate fabrication step was essential to obtain the necessary homogeneity and soundness.

36. In order to maintain the schedule set by AEC, and particularly Admiral Rickover, it became apparent that the facilities at the Bureau of Mines and WAPD were not adequate for large scale production of large zirconium alloy ingots of requisite homogeneity, soundness and cleanness. Accordingly, AEC and WAPD approached a number of commercial melting organizations understood to have facilities capable of producing the desired ingots in quantity. Allegheny Ludlum Corporation was one of the companies approached.

37. Until 1949, Allegheny had been a specialty steel producer. At this time, a decision was made to enter into development and commercial production of titanium in view of the attractive potential of that metal for structual purposes. At the time Allegheny Ludlum was approached, it was known to have the capability of melting 12 inch titanium ingots. By early 1952, Allegheny Ludlum had melted a few zirconium ingots from sponge for the AEC, but such ingots had not been acceptable.

38. For a period of several months prior to April 8, 1952, plaintiff had itself been remelting zirconium-tin alloy ingots supplied to it by the Bureau of Mines, with the aim of improving the homogeneity and soundness thereof, by a

nonconsumable electrode arc melting procedure which involved rolling the ingot into a sheet, chopping the sheet into small bits and mixing and blending the bits prior to remelting. This process was not suitable to AEC's needs for high volume, low cost production, and it was in hopes of finding a commercial source of sound, homogeneous ingots that plaintiff sought the melting assistance of Allegheny Ludlum.

39. As of April 8, 1952, Allegheny Ludlum was reputed to be skilled in consumable electrode arc melting technique, and was known to have been actively engaged for some time in the melting of titanium and titanium alloys (which are somewhat similar to zirconium and zirconium alloys insofar as melting is concerned), by means of such techniques. Allegheny Ludlum maintained its melting processes and equipment in confidence.

40. A meeting between representatives of Allegheny, AEC and WAPD was held on April 8, 1952.

41. For several months prior to April 8, 1952, both the Government and plaintiff had been seeking to enlist the aid of Allegheny Ludlum in solving their problem of producing sound and homogeneous zirconium ingots in volume and to induce Allegheny Ludlum to enter into an experimental melting program.

42. At the April 8, 1952, meeting, Allegheny Ludlum agreed to enter into an experimental melting program. Allegheny Ludlum's motives in entering into the program were threefold: First, to take advantage of the opportunity thus afforded for research in the new material, zirconium, without cost to itself; second, the greater opportunity thereby afforded for participation in the eventual commercial supply of zirconium products for the Government's reactor program; and third, a patriotic desire to help the Government in solving a problem vital to national defense. These motives or objectives were realized, in that Alle-

gheny Ludlum supplied in excess of 500,000 pounds of zirconium alloy products for that program.

43. Plaintiff's motives in establishing the experimental melting program were: First, to speed solution of its melting problems, and second, to establish a much needed commercial source of supply of economical zirconium products of requisite quality and quantity.

44. Prior to attending the April 8, 1952, meeting, Hurford and Gordon discussed the various melting processes then in use or under consideration with their two subordinates, Goodwin and Lorenz. During the course of this discussion, the suggestion of the direct remelting of an ingot as an ingot without intermediate fabrication (forging and rolling) was disclosed to Goodwin and Lorenz. As a result of an order by Dr. Gordon, research records were reviewed and patent disclosures submitted prior to the end of the year. On December 24, 1952, the disclosure was reviewed by and discussed with Goodwin and Lorenz who executed it as witnesses on that date and recorded the date of April 4, 1952, as the date of Hurford's initial disclosure to them.

45. The direct remelting portion of the claimed invention described by the patent in suit was first performed by Allegheny Ludlum pursuant to purchase orders from plaintiff. These orders were issued in an experimental melting program to find improved ways and means of producing sound and homogeneous zirconium alloy ingots for use in the United States Government's shipboard thermal reactor development project, of which plaintiff was principal contractor and in overall charge. Allegheny Ludlum agreed to take part in the experimental program by accepting from plaintiff and performing purchase orders for melting.

46. The experimental program referred to, *supra*, had its inception at the meeting of personnel of plaintiff, Allegheny Ludlum, and AEC on April 8, 1952. At this meeting,

Allegheny Ludlum undertook, using its background of knowledge and experience in consumable arc titanium melting, and employing its titanium research facilities, and personnel, to melt under Westinghouse Purchase Order 21222 a series of three zirconium tin alloy ingots from zirconium sponge to be supplied by the Government. Allegheny Ludlum further agreed to sample each ingot produced and ship the samples to Mr. Hurford for homogeneity, soundness and contamination determinations. The results of these determinations were to be telephoned to Mr. Herres, then of Allegheny Ludlum, so that he could vary his melting practice in the next ingot according to the results obtained on the previous one. If the single-melted ingots did not meet the plaintiff's specifications, Allegheny Ludlum agreed to remelt the ingots. Allegheny Ludlum personnel expressed the opinion at the meeting that it should not be necessary to double-melt zirconium alloy in order to achieve the desired homogeneity and soundness.

47. At the April 8, 1952, meeting, Allegheny Ludlum agreed to accept an experimental order to remelt a number of single-melted Bureau of Mines' zirconium alloy ingots, which had failed to meet plaintiff's homogeneity and soundness specifications, in order to attempt to improve the homogeneity and soundness thereof. Allegheny was to melt one ingot, sample it, ship the samples to WAPD for analysis and then receive the results of analyses and authorization from WAPD to melt the next ingot. The analyses of the Bureau of Mines' ingots were to be shipped to Allegheny Ludlum so they could determine the best manner to remelt those ingots into homogeneous and sound ingots.

48. Finally, Allegheny Ludlum agreed at the April 8, 1952, meeting to double-melt an ingot from the relatively porous "C" grade sponge, by melting the sponge into a 12 inch diameter ingot, shipping a slice from each of the top and bottom to plaintiff, and then remelting the balance into

a 12 inch diameter ingot to be held for fabrication under a separate purchase order.

49. It was agreed that Allegheny Ludlum would be paid for the melting operations to be performed, whether or not the resulting ingots were satisfactory. Under its agreement with the AEC, all of plaintiff's expenses in the submarine thermal reactor program, including this program of developing through Allegheny Ludlum a satisfactory commercial source of Zircaloy, were paid by the Commission.

50. It is not disputed that the first direct remelting of zirconium alloy ingots was the melting of certain Bureau of Mines' zirconium alloy ingots into ingots Nos. ZR 37, ZR 38, ZR 39 and ZR 40 during the period from July 12 to 23, 1952, by personnel of Allegheny Ludlum at Watervliet, New York, done in the absence of any representative of plaintiff. The ingots so melted were supplied, under purchase orders 21247 and 21339, to Westinghouse employee Hurford and various tests performed on them at Westinghouse under Hurford's supervision. The tests showed that the inhomogeneous and unsound Bureau of Mines' ingots had been changed into satisfactory homogeneous and sound ingots by the direct remelting procedure. Accordingly, the melting to form ingots Nos. ZR 37, ZR 38, ZR 39 and ZR 40 completed a successful use of the process of the patent in suit.

EVIDENCE OF GORDON AND HURFORD CONCEPTION

51. The evidence offered by plaintiff to establish an original conception of the patented process by its patentees prior to the melting of ingots ZR 37-40 by Allegheny Ludlum, in addition to the purchase requisition (see F 59), consists of oral testimony of the patentees themselves; the patentees' patent disclosure form, dated December 24, 1952, stating the alleged invention was disclosed on April 4, 1952, to two of the patentees' subordinates Lorenz and Goodwin; the signatures of Lorenz and Goodwin; and testimony by Lorenz and Goodwin.

52. Lorenz and Goodwin both testified at the trial on behalf of plaintiff, but at the time of their testimony neither had any recollection of the April 4, 1952, disclosure referred to in F 51, supra. Nevertheless, both testified to the great importance they attached to selection of the correct date for receipt of the disclosure, and their certainty that they had received the disclosure April 4, 1952, or they would not have signed the patent disclosure document and inserted that date adjacent to their signatures. Mr. Lorenz testified that at the time of his signing the patent disclosure form, Mr. Hurford presented to him a collection of documents which they reviewed after he had read the disclosure form. He also stated that he would not have signed the patent disclosure if he had not been convinced at that time by the material in the disclosure form and the documents he had reviewed that the date April 4, 1952, was correct for the prior disclosure.

53. When they signed the patent disclosure form as "witnesses" on December 24, 1952, both Lorenz and Goodwin were employees of plaintiff working directly under Hurford's supervision. Their signatures were placed on the form at Hurford's request, and either Hurford suggested the April 4, 1952, date to them or that date evolved out of a conversation with Hurford.

54. Mr. Goodwin was in close daily contact with the operations of plaintiff which involved melting by Allegheny Ludlum, continuously from the date April 4, 1952, to the date of witnessing the patent disclosure document on December 24, 1952. Mr. Lorenz also worked on the same project until November, 1952, and continued melting work with Hurford thereafter. Accordingly, it is not unbelievable that Goodwin and Lorenz could accurately remember both the disclosure and its date, over a period of 8½ months prior to memorializing both in the disclosure form.

55. Defendant contends that when the patent disclosure form was prepared, on December 24, 1952, the patentees believed that the process in question had been disclosed at the

April 8, 1952, meeting with Allegheny Ludlum and in Hurford's minutes of that meeting and that this belief made it incumbent upon the patentees to assert a conception date prior to April 8, 1952, in order to substantiate their claim of originality.

56. The items of evidence asserted to justify this contention are (1) a memorandum of February 12, 1953, by a Mr. Van Horn, whose testimony was not taken in this action, but who attributed to Gordon a statement that the alleged invention was disclosed at the meeting in question, and (2) a reference in the transmittal form for the patent disclosure of the alleged invention to Hurford's minutes of that meeting.

It is apparent from a reading of the minutes and the patent disclosure that the alleged invention in suit was not disclosed in the minutes. Similarly, the alleged invention was not disclosed in the trip report or purchase order 21247. The reference to these items in the transmittal form states that the method was "briefly mentioned," rather than "disclosed." Whether it was strictly accurate to state that a direct remelting method, without intermediate fabrication, was "briefly mentioned" by mere mention of remelting, as was made in all reference documents, is questionable. However, Hurford explained in his testimony that the documents were merely related to the patent matter and were referenced for that reason. Hurford's explanation is logical and deemed truthful.

Gordon's pretrial deposition taken by defendant was introduced in evidence at the trial. Though he was not examined concerning the accuracy of the statement attributed to him by Mr. Van Horn, he stated that he was not willing to disclose the alleged invention in April 1952 and that the Hurford minutes of the April 8 meeting, which do not indicate the alleged invention was there disclosed, were accurate.

57. In the light of all the circumstances, there is no reason seriously to doubt the acuracy of the date April 4, 1952, disclosure of the alleged invention to Goodwin and Lorenz.

EVIDENCE OF COMMUNICATION OF CONCEPT TO ALLEGHENY LUDLUM

58. First disclosure of the alleged invention in suit was given to Allegheny Ludlum in a telephone conversation between Hurford and Allegheny Ludlum employee Crosier between the end of June and July 3, 1952.

59. The document of earliest origin which is of record in this case which evidences the existence of the suggestion of the patented process in the mind of either Gordon or Hurford, is plaintiff's purchase requisition 73-E-21339-M, which was prepared by Hurford, and typed and approved by Dr. Gordon's supervisor on July 3, 1952.

60. Hurford decided in late June to try out the direct remelting technique without intermediate fabrication, and communicated that decision to Mr. Crosier by telephone. The date of the telephone communication was fixed by Hurford by the analysis information for ingot ZR 36 (which showed the failure of direct melting to achieve the requisite homogeneity and soundness and triggered the decision to directly remelt) and the July 3 purchase requisition 21339, which expressly mentions remelting 7½ inch diameter Bureau of Mines' ingots into 12 inch diameter ingots without fabricating them.

61. Ingot ZR 36 was melted on May 26, 1952, and samples shipped to plaintiff. The analysis information for the ingot bears a handwritten note: "Info to AEC July 1, 1952," thereby indicating that Hurford had the information by the end of June 1952.

62. Hurford testified that he told Crosier that he had another order for melting under which he wanted the ingots directly remelted as ingots without fabrication. The telephone communication was prior to the July 3, 1952, date borne by the purchase requisition, but Hurford had before him a handwritten notation containing the same direct remelting information as the requisition.

63. The 21339 purchase requisition was followed by a formal purchase order of the same number which bears an issue date of July 7, 1952, and which contains the specific statement:

> "The purpose of this order is to determine if 12" dia. ingots can be melted from 7½" dia. ingots without fabricating them and to determine the effect of remelting on the tin homogeneity."

This, of course, is the remelting step of the alleged invention in suit.

64. That the 21339 purchase order was communicated to Allegheny Ludlum is established:

(1) by a statement thereon: "Confirming verbal order to Mr. C. L. Crosier, 7/7/52";

(2) by a shipment notice of "L" order dated July 3, and a bill of lading shipping to Allegheny Ludlum the Bureau of Mines' ingots to be remelted on order 21339, bearing the handwritten note: "Rec. C. L. Crosier OK 7/7/52";

(3) by the Allegheny melt records for ingots ZR 38 and 39, admittedly melted under order 21339(W) and showing a first date of work on these ingots of July 9, 1952;

(4) by the shipment of ingots ZR 37 and ZR 38 to plaintiff from Allegheny on July 18, 1952;

(5) by a Crosier work status report to his superior, Mr. Pierce, identifying the 21339 order as received July 7, 1952; and

(6) by an Allegheny order copy dated August 1, 1952, showing the customer order date as of 7/7/52.

65. At some time not now precisely known, but after the first disclosure of the direct remelting method to Mr. Crosier, the latter reported to Mr. Hurford his difficulty in welding together bars forged under the 21247 purchase order to fabricate a consumable bar electrode for remelt-

ing, and Hurford authorized him to discontinue that method and use the direct remelting technique for the rest of the Bureau of Mines' ingots supplied to Allegheny under that order.

EVIDENCE OF HERRES AND SOUTHERN CONCEPTION AND COMMUNICATION TO PLAINTIFF

66. Allegheny Ludlum's head of titanium research, Herres, testified that he had in mind the idea of remelting Bureau of Mines' zirconium alloy ingots as ingots, without intermediate forging or rolling, immediately following plaintiff's request to Allegheny for the remelting of such ingots on April 8, 1952. Herres' associate, Southern, testified that he decided to use zirconium alloy straps for welding Bureau of Mines' ingots together to form consumable electrodes for remelting, that either he or Herres ordered the straps for that purpose from plaintiff and that the straps shipped to Allegheny Ludlum pursuant to plaintiff's shipment notice of June 30, 1952, were sent in response to that order. There is no testimony that such alleged purpose for the straps was communicated to plaintiff. Defendant relies on no earlier (or other) documentary evidence than the shipment notice to substantiate its alleged conception and communication to plaintiff.

67. Allegheny Ludlum maintained and ultimately produced a chronologically complete set of reports covering its titanium melting development. These records embrace laboratory notebooks and periodic progress reports describing melting techiques, scrap recovery, furnace development and the like.

68. The testimony of Herres and Southern that Allegheny Ludlum, and, specifically, Southern, had directly remelted titanium scrap ingots as ingots, finds no support in Allegheny Ludlum's own pertinent and chronologically complete records. A construction of defendant's Exhibit II 49 at-

tributing to the words "remelt titanium ingots," even an intention to directly remelt scrap ingots as ingots, is inconsistent with the context of the entire record. On the other hand, construction of these words to reflect an intention to produce a second ingot by remelting scrap in the minutely described "sheathing process" is wholly consistent with the entire record.

69. The Court finds no convincing evidence that Allegheny Ludlum in fact directly remelted scrap titanium ingots as ingots. The Court believes defendant's witnesses are mistaken in their contrary recollection.

70. The four ingots referred to in F 50, *supra*, Nos. ZR 37-ZR 40, were arc melted from consumable electrodes formed by Allegheny Ludlum from single-melted zirconium alloy ingots joined end-to-end by means of zirconium alloy straps overlapping the joints and welded to the ingot surfaces. Similar straps were used for attaching the electrodes to the ram of the furnace.

71. Prior to that melting operation, Allegheny Ludlum had received plaintiff's purchase orders Nos. 21247 and 21339, Bureau of Mines' ingots, and zirconium alloy straps, for melting under those purchase orders.

72. Plaintiff's experimental purchase order 73-R-21247-M, under which ingots ZR 37 and ZR 40 were melted, provided as follows:

> "This is an experimental purchase order to remelt 1000 pounds of 7½" dia. 100 to 150 lbs. Bureau of Mines zirconium alloy ingots into 12" diameter consumable electrode arc melted ingots.
>
> "The purpose of this purchase order is to determine if homogeneous ingots can be obtained from ingots which do not meet our homogeneity specifications by fabricating them into consumable electrodes and remelting them in your arc furnace. Analyses of the Bureau of Mines ingots will be supplied with the ingots

so that you can determine the best procedure to follow in remelting them into homogeneous ingots.

"The 1000 pounds should be melted into three 12" dia. ingots which may vary from 200 to 500 pounds."

73. Throughout the trial, testimony was adduced by defendant from interested witnesses that the word "fabricate" with respect to first-melt ingots was broad and could mean "to join together." Plaintiff urged, and the documentary record supports, the obvious meaning of "fabricate" in this context as involving forging and rolling to reduce the ingot bars, sheets or particulate form for remelting. Beall, a highly knowledgeable witness the Court believes to be impartial, agreed with plaintiff. The Court finds that the meaning of "fabricate" or "fabrication," as employed in the WAPD purchase orders, is that urged by plaintiff and that defendant so understood.

74. The analyses of the Bureau of Mines' ingots were enclosed with a letter from Mr. Hurford to Mr. Herres, dated April 17, 1952, which stated:

"* * * we would like one 250 pound ingot melted from a consumable bar electrode and one 250 pound ingot from small diameter rods bundled to form an electrode. A 500 pound ingot will then be melted with whichever practice gives the more homogeneous ingot."

75. Some zirconium alloy straps to be used for assembling the consumable electrodes for ingots were shipped to Allegheny, at the firm's request, pursuant to plaintiff's shipment notice dated June 30, 1952, which, on its face, set forth the intended use of the straps as "for welding of ingots into consumable electrodes" and which identified the purchase order in response to which this was to be done as 73-R-21247-M

76. At about the same time as the shipment of the straps under the 21247 purchase order, Mr. Crosier, of Allegheny Ludlum, was in the process of forging and rolling Bureau

of Mines' ingots to bar form for assembly into a consumable bar electrode for remelting. By reason of the steel strike then going on and affecting the Allegheny Ludlum operations, some of the forging and rolling work had to be done at the Watervliet Arsenal, a Government installation. The record indicates that such work had not been completed on July 3, 1952, when the straps were received at Allegheny Ludlum. At some unknown time thereafter, Mr. Crosier attempted to weld the two-inch-square bars into an electrode but had difficulty in so doing. Upon reporting that fact to Mr. Hurford, the latter suggested that this method of remelting be discontinued for the present.

77. The parties are in disagreement as to the significance of the request for and shipment of the zirconium alloy straps. Defendant takes the following position:

> "Allegheny's request for zirconium alloy straps 'to use for welding of ingots into consumable electrodes' for remelting in response to plaintiff's experimental purchase order 73-R-21247-M, the stated purpose of which was 'to determine if homogeneous ingots can be obtained from ingots which do not meet [plaintiff's] homogeneity specification by fabricating them into consumable electrodes and remelting them,' must necessarily have been preceded by a conception on the part of Allegheny's workers of the accused process itself—'preparing a first arc-cast ingot of zirconium, * * * and without intermediate fabrication (i.e., forging or rolling or chopping), remelting that ingot as a consumable electrode, to produce a second ingot.' "

78. In contrast, plaintiff takes the position:

(1) that the straps could as well have been used for the purpose of joining the two-inch-square bars together, or for joining ingots together, and that the unexplained use of the single word "ingots" in the L order is not dispositive of the matter; and

(2) that since Hurford had decided by the date of shipment of the straps to use the direct remelting

method and since the instruction to directly remelt could as well have been communicated to Crosier by that date (see F. 59, supra), any interpretation of the language of the shipment notice to reflect a concept of direct remelting should be attributed to Gordon and Hurford.

79. Considering all the circumstances, including the evidence of prior suggestion by Gordon and Hurford of the direct remelting method, the shipment notice for straps under the 21247 purchase order is too equivocal to satisfactorily corroborate a suggestion of that method by Herres and Southern, or communication of that concept to plaintiff.

80. Accordingly, since the alleged conception by Herres and Southern rests on their unsupported testimony, 15 years after the events, it is not established that Allegheny Ludlum's workers conceived of the process here in issue and communicated that process to plaintiff, prior to plaintiff's receipt on or before June 30, 1952, of Allegheny Ludlum's request for zirconium alloy straps.

COMMERCIAL SUCCESS

81. For the next several years, all zirconium ingots prepared by Allegheny Ludlum for use by WAPD in their atomic reactor program were produced by a double-melting process in which zirconium sponge was formed into compacts, the compacts were welded together to form composite electrodes and such electrodes were melted in a first consumable arc process to form a first-melt ingot. The first-melt ingots of approximately 8 inches in diameter, without intermediate fabrication, were employed as consumable electrodes in a second melting procedure to form the final ingots 12 inches in diameter and were characterized by requisite homogeneity, soundness and cleaness.

82. Today the Gordon and Hurford process of direct double-melting of ingots, without intermediate fabrication

as the means of producing sound homogeneous ingots of reactive metals, "has gone into universal use." This court witnessed operation of such a process in defendant's Henderson plant on January 26, 1967.

INFRINGEMENT

83. Defendant has abandoned this defense.

CONCLUSIONS OF LAW

A. This Court has jurisdiction of both the parties and the subject matter in this action. 35 U.S.C. § 281, 28 U.S.C. §§ 1338(a) and 1400(b).

B. The patent in suit is not invalid because the alleged invention was made in this country by personnel of the Allegheny Ludlum Steel Corporation. Nor is the patent invalid because plaintiff's personnel learned of the alleged invention from Allegheny Ludlum.

C. Defendant infringes claims 1, 2, 3, 4, 5, 6, 7, 8 and 11 of the patent in suit.

D. The Bureau of Mines "828" process in prior art as against the patent in suit.

E. Allowance of the patent in suit by the Patent Office without knowledge and consideration of the facts regarding the Bureau of Mines' "828" process, and without knowledge or consideration of the published prior art referred to in findings 14, 15, 16, 17 and 18, supra, deprives the patent of any presumption of validity with respect thereto.

F. The claims of the patent in suit are of such scope as to define novelty over the prior art including the "828" process of the Bureau of Mines, and are, therefore, not invalid for lack of novelty.

G. But the patent in suit is invalid because the subject matter as a whole was obvious at the time the alleged invention was made to a person having ordinary skill in the art to which said subject matter pertains. That the process

of the patent in suit was obvious to one skilled in the art is established in this case not only by the prior art and, in particular, the "828" process, but also by the subsequent, but almost simultaneous, independent accomplishment of the direct remelting of an ingot as an ingot without intermediate fabrication at the Bureau of Mines by the "610" process.

ORDER

The Clerk is directed to enter judgment in favor of the defendant against the plaintiff. Costs will be denied in view of the benefit the defendant and its parent company, Allegheny Ludlum, have had from the use of the process put into practice by Allegheny Ludlum as the result of the suggestion of plaintiff's employee, Hurford, notwithstanding the fact that the suggested process has been found to fall short of a patentable invention.

JUDGMENT ON DECISION BY THE COURT

[Filed October 1, 1969]

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEVADA

Civil Action File No. LV-792

WESTINGHOUSE ELECTRIC CORPORATION,
Plaintiff,

v.

TITANIUM METALS CORPORATION OF AMERICA,
Defendant.

JUDGMENT

This action came on for trial before the Court, Honorable Roger D. Foley, United States District Judge, presiding, and the issues having been duly tried and a decision having been duly rendered,

It is Ordered and Adjudged that judgment be entered this date in favor of the defendant and against the plaintiff, and that costs be denied.

Dated at Las Vegas, Nevada, this first day of October, 1969.

BERNARD SUPERA,
Clerk of Court

By CAROL C. FITZGERALD
Carol C. Fitzgerald
Chief Deputy Clerk

[SEAL]

Application of Robert B. Gordon and Walter J. Hurford.

Patent Appeal No. 6810.

United States Court of Customs and Patent Appeals.

May 18, 1962.

Before RICH, Acting Chief Judge, and MARTIN, and SMITH, Judges, and Judge WILLIAM H. KIRKPATRICK*

RICH, Judge.

This appeal is from the decision of the Patent Office Board of Appeals affirming the rejection of claims 1, 2, 4, 5, 6, 9, and 10 in the application of Robert B. Gordon and Walter J. Hurford, Ser. No. 367,524 filed July 13, 1953, entitled "Method of Producing Sound and Homogeneous Ingots." The sole issue is patentability over the following references:

Rohn	1,555,313	Sept. 29, 1925
Herres et al.	2,541,764	Feb. 13, 1951
Herres	2,640,860	June 2, 1953

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* United States Senior District Judge for the Eastern District of Pennsylvania, designated to participate in place of Judge O'CONNELL, pursuant to provisions of Section 294(d), Title 28 United States Code.

Appellant's specification discusses the background of their invention as follows:

> "Considerable difficulties have been encountered in producing sound, clean and homogeneous ingots from the refractory and easily oxidizable metals and alloys thereof, such, for example, as titanium, zirconium, uranium and vanadium, and various alloys thereof. These metals in particular react readily with oxygen and nitrogen to form compounds which are extremely difficult to decompose in order to remove the anion component thereof. In the process of preparing ingots from these elements and their alloys by the most meticulous procedures known to the art, there are inevitably produced ingots whose surfaces are thickly contaminated with oxides and other impurities, such, for example, as the salts that may have been employed in producing the metals. The interior of the ingots is usually porous and contains much entrapped gases. The alloys of these elements show considerable variations in composition from point to point along the ingots. At the present time, for subsequent processing, the accepted procedures involve the removal of a large portion of the cast ingots, particularly at the surfaces, which portions are discarded. The core of such ingots is often rolled or worked into bars or rods in order to homogenize the composition and to reduce the porosity. Such bars or rods are then cut or otherwise reduced to small particles and remelted in an arc melting furnace into a useable ingot of reasonably sound structure. However, these ingots, though more homogeneous than the first ingots, are contaminated from gases picked up during fabrication for remelting and the products made therefrom vary considerably in their properties."

As to their own invention, appellants state:

> "The object of this invention is to provide a process whereby sound, clean ingots of a high degree of homogeneity are produced by a simple process involving two successive arc melting operations with substantially no waste of the metal being made into the final ingot.

* * * * *

> "We have discovered a simple process for producing sound, clean and highly homogeneous ingots from refractory and easily oxidizable metals, which are usually in the form of powder or sponge as a result of reduction from the oxide or other compound thereof, by arc melting the metals as a consumable electrode in an inert atmosphere or vacuum to produce an initial ingot, and then employing said initial ingot as a consumable electrode in a second arc melting operation also in an inert atmosphere or under vacuum whereupon the second arc melting produces a final ingot having the desired properties. * * * All intermediate processing with attendant waste and scrap as required heretofore, is completely eliminated."

Appellants disclose that their consumable electrode is prepared from sponge or other crude form of the refractory metal to be melted. The sponge metal is "pressed into compacts at pressures of the order of 40,000 psi * * *." Appellants state that the compacts produced from such sponge metals "usually contain a substantial proportion of salts, such as magnesium chloride, magnesium, and metal oxides, such as zirconium oxide, present along with small amounts of entrapped nitrogen and other gases." These compacts are then "assembled together by tack welding them at several points while in an inert atmosphere, such, for example, as argon. By such welding procedures, a composite electrode member may be prepared which may be 4 feet long by 4 inches by 4 inches in cross-section."

Claim 1 is exemplary and reads as follows:

> "1. In the process of preparing sound and highly homogeneous ingots from easily oxidized refractory metals, the steps comprising preparing an electrode of the refractory metal, placing an end of the prepared electrode within a cooled mold, passing an electrical current between the electrode and the mold whereby the electrode is progressively melted from said end and is deposited in the bottom of the mold, the molten metal deposited in the mold progressively solidifying to build up an ingot, the melting of the electrode being carried

out in the absence of a reactive gas the resulting solidified ingot characterized by a relatively poor, contaminated surface and inhomogeneity, thereafter employing the entire resulting ingot as a second electrode and remelting only such ingot into a second ingot under similar conditions to the preparation of the first ingot whereupon the second ingot is characterized by a clean surface relatively free from contaminations and the metal in the ingot is highly homogeneous."

The Rohn reference discloses a process of "degasifying metals," by repeatedly melting them in a "furnace," specifically an induction furnace, under critical temperatures and reduced pressures, which are *different* for each melt. Referring to the effect that such remelting has on the chemical composition of the metals treated, Rohn states, "before and after the melting the chemical composition *differed but immaterially.*" (Emphasis added.) In particular we note that Rohn nowhere discloses that it is an aim of his process to remove oxide and salt impurities from his melted metal. Nor does he suggest arc melting.

The Herres et al. disclosure pertains to a "method and apparatus for melting refractory metal, and more particularly to a method and apparatus for reducing powdered metals to ingot or casting form in which the melting and casting are performed concurrently." The Herres et al. ingots are formed in the following manner: powdered metal is fed in a continuous stream to a cylindrical chamber; in this chamber the metal is melted by an arc between one end of a consumable cylindrical electrode and the powdered metal. The Herres et al. electrode material is replenished by introducing powdered metal at the other end of the electrode and arc melting this metal by means of an arc between a non-consumable electrode and the powdered metal. The Herres et al. consumable electrode, accordingly, is consumed at one end and simultaneously built up at the other. It can be seen, therefore, that the Herres et al. ingots are formed in part by metal arc melted twice

and in part by metal arc melted only once. As in appellants' invention, the Herres et al. arc welding steps preferably "take place in an atmosphere filled with inert gas such, for example, as argon or helium, or a vacuum * * *." Herres et al. also disclose that melting of refractory metals in crucible-type furnaces is extremely difficult and generally unsatisfactory because of the tendency of the metals to react with the ceramic and contaminate the metal. By various means, including water cooling their ingot-containing chamber walls, Herres et al. obviate this problem. We note, however, that the Herres et al. disclosure does not allege that any mechanical, physical, or chemical property if the original powdered metal is improved by the arc melting procedure disclosed. Particularly, no disclosure exists in Herres et al. indicating that oxide and salt impurities might be removed from a metal by arc melting.

Herres discloses a process for converting, by arc melting, a consumable electrode of a refractory metal such as titanium, of a given cross-section, into an ingot of substantially larger cross-section. The consumable Herres electrode "is made by pre-forming titanium powder or titanium sponge metal up to one inch in particle size at a pressure of approximately 15 tons per sq. in. to form sticks of convenient length and cross section." A mechanism is provided for successively flash welding these "sticks" and feeding them toward the furnace in which the electrode metal is being melted. The Herres ingots may be made either by continuously arc melting the electrode material alone, or by introducing into the ingot-forming, metal-melting chamber additional "alloying metals or elements" thereby forming an ingot composed in part of electrode material and in part of these additional metals or elements. As in the Herres et al. disclosure, Herres discloses that:

> "An ambient atmosphere is maintained about the titanium-base sticks, as well as within the furnace and about a delivery end thereof that is non-contaminating

of the titanium. Gases which are inert to titanium, such as argon, helium and neon, or a vacuum may be employed for this purpose."

As is the case with Rohn and Herres et al., Herres does not disclose that oxide and salt impurities might be removed from a metal by arc melting.

The appealed claims stand rejected as unpatentable over (1) Rohn in view of Herres et al. and Herres, or (2) Herres et al. in view of Rohn and Herres.

As to the first rejection, the examiner stated:

"It is considered non-inventive to modify the double melting process of Rohn by a double arc melting technique of the type shown by Herres et al (1). In Rohn the reasons for and results obtained by the double melting are disclosed to the extent that only ordinary skill would be necessary to modify the process in accordance with Herres et al (1). Use of consumable electrodes in melting processes is old and well known, and it is also well known that consumable product metal briquette-type electrodes may be used to produce molten refractory metal as shown by Herres (2). Utilization of the well known techniques of Herres et al (1) and Herres (2) would produce nothing unexpected."

In affirming this rejection of the examiner, the board stated in part that "we regard the teaching in Rohn as constituting the essential principles upon which the present process is based."

We cannot sustain this rejection as we find both the examiner and the board fundamentally in error as to what are "the reasons for and results obtained by" and the "essential principles" of appellants' process.

The main result obtained by appellants' invention is, as we see it, that an ingot of refractory metal may be produced thereby with "substantially no waste of metal being made into the final ingot." The "attendant waste and scrap as

required heretofore, is completely eliminated'' by appellants' process. This point is repeatedly made by appellants in their specification and in their objection to the Patent Office's combination of references. Commenting on the pertinence of the Herres et al. reference, for example, appellants, in their brief before this court, state that "as long as fresh metal powder from tank 41 flows into the second arc melting region in Herres et al (1) *it introduces impurities, non-homogeneity and leads to a defective ingot structure.*" (Emphasis added.)

We note that the board itself recognized the deficiency of the prior art, particularly with reference to Rohn, when it said:

> "Since the Rohn patent is limited to the treatment of metals which are not refractory in their nature, the problems referred to by appellants would not exist."

Accordingly, in view of our understanding of what appellants' invention is, we find the reasoning behind this rejection untenable.

While the board did not specifically refer to the examiner's second rejection, it did affirm the examiner generally and hence affirmed this rejection as well. Appellants have assigned as error the board's refusal to reverse this rejection, thereby bringing it before us for consideration.

The examiner succinctly stated his second rejection as follows:

> "Furthermore, Herres et al (1) could be modified without invention in accordance with Rohn by omitting the powder metal from hopper 41 [the second source of powdered metal in the Herres et al. disclosure] and utilizing electrode 31 as the sole source of metal for the final ingot."

We are unable to find in Rohn any suggestion or reason for so modifying Herres et al., as assumed by the exam-

iner, even if the results obtained by appellants in their invention were being sought after. It is not altogether clear to us, moreover, how one would modify Herres et al. "in accordance with Rohn." Rohn melts over differing periods with varying pressure and temperature conditions in an induction furnace for the sole purpose of degasifying thoroughly. We do not find anything in Rohn which would suggest any modification of the Herres et al. structure, or its operation. We believe these references would not suggest to one skilled in the art that *double arc melting* of a refractory metal would result in the allegedly unexpected removal of oxides and other contaminants from the metal.

For the above reasons the decision of the board is reversed.

Reversed.

MARTIN, Judge, sat but did not participate because of illness.

STATUTES INVOLVED

35 U.S.C. 103: Conditions for Patentability: Non-Obvious Subject Matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

35 U.S.C. 141: Appeal to Court of Customs and Patent Appeals

An applicant dissatisfied with the decision of the Board of Appeals may appeal to the United States Court of Customs and Patent Appeals, thereby waiving his right to proceed under section 145 of this title. A party to an interference dissatisfied with the decision of the board of patent interferences on the question of priority may appeal to the United States Court of Customs and Patent Appeals, but such appeal shall be dismissed if any adverse party to such interference, within twenty days after the appellant has filed notice of appealing according to section 142 of this title, files notice with the Commissioner that he elects to have all further proceedings conducted as provided in section 146 of this title. Thereupon the appellant shall have thirty days thereafter within which to file a civil action under section 146, in default of which the decision appealed from shall govern the further proceedings in the case.

35 U.S.C. 144: Decision on Appeal

The United States Court of Customs and Patent Appeals, on petition, shall hear and determine such appeal on the evidence produced before the Patent Office, and the decision shall be confined to the points set forth in the reasons of ap-

peal. Upon its determination the court shall return to the Commissioner a certificate of its proceedings and decision, which shall be entered of record in the Patent Office and govern the further proceedings in the case.

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United States

OCTOBER TERM, 1971

No. 71-1354

WESTINGHOUSE ELECTRIC CORPORATION, *Petitioner*,

vs.

TITANIUM METALS CORPORATION OF AMERICA, *Respondent*.

BRIEF IN OPPOSITION TO PETITION FOR WRIT OF CERTIORARI

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